REMARKS

This is in response to the Office Action mailed on April 20, 2005. Claims 1-34 were pending in the application, and the Examiner rejected all claims. With this amendment, claim 16 is amended and the remaining claims are unchanged. Applicant respectfully traverses the Examiner's rejections.

On page 2 of the Office Action, the Examiner rejected claims 1-3 and 10-34 under 35 U.S.C. §103(a) as being unpatentable over White et al. (U.S. Patent No. 5,237,502). Of the rejected claims, claims 1, 16, 18, 23 and 32 are independent claims.

The aspect of the present invention set out in independent claim 1 takes a logical form generated from a natural language input text and selects transfer mappings that match the input logical form. The selection of matching transfer mappings is performed by matching portions of the input logical form against portions of the transfer mapping.

For instance, FIG. 8 shows one example of some transfer mappings in which logical forms in English and Spanish are mapped to one another. Thus, to select matching transfer mappings, a logical form for a Spanish language input is matched against the left sides of the transfer mappings to find "matching transfer mappings." The matching transfer mappings are combined to get an English language logical form from the right sides of the matching transfer mappings. The textual output is generated from the resultant English language logical form.

Specifically, claim 1 states "selecting a set of one or more of a plurality of matching transfer mappings in a transfer mapping database that match at least a portion of the input logical form, based on a predetermined metric; combining the set of transfer mappings into a target logical form; and generating the textual output based on the target logical form." White et al. simply fails to teach or suggest this. Instead, white takes

an input logical form and maps it directly into a set of initial syntax trees. There is no teaching or suggestion in White et al., anywhere, of mapping one logical form to transfer mappings that are used to create another logical form.

Moreover, White et al. does not even teach details as to how the match is made between the input logical form and the syntax trees. Applicant was only able to find a few brief references to this match (which is not even a match to a transfer mapping which includes logical forms, but is instead a match from a logical form to a syntax tree). The first is are found in column 3, line 59 where White et al. state "The logical form is mapped to a set of trees." The second is found at column 5, line 20 where White et al. state "Code in the paraphraser maps CLF expressions to initial trees, which are the objects the grammar writer is concerned with." Finally, in column 21 of the Appendix (roughly the bottom third of the page) White et al. state "Each CLF maps to an initial tree structure which contains the semantic information expressed in the CLF...". White et al. specifically states that "[The initial trees] are syntax trees of the sort one might find in an ordinary analysis grammar." (emphasis added) See column 5, lines 35-37.

Therefore, not only does White et al. completely fail to teach or suggest mapping from one logical form to another logical form, even the mapping which White does briefly mention (mapping from a logical form to a syntax tree) is simply not described. At best, White et al. simply state that "code in the paraphraser maps CLF expressions to initial trees..." (See column 5, lines 20 and 21). There is no indication, whatsoever, that White et al. uses a transfer mapping database to map between two structures, much less between one logical form and another logical form. Therefore, Applicant submits that independent claim 1 is allowable.

Independent claim 16 also includes "a transfer mapping data store including a plurality of transfer mappings having a logical form in the first language mapped to a logical form in the second language; a matching component configured to match input logical forms generated based on the textual input in the first language to a set of one or more of a plurality of matching transfer mappings in the transfer mapping database when the logical form in the first language of a matching transfer mapping matches at least a portion of the input logical form, based on a predetermined metric; [and] a generation component configured to generate the textual output based on the logical form in the second language in the selected transfer mappings." Again, White et al. specifically fails to teach or suggest how any mapping is done, much less mapping from an input logical form to a transfer mapping. Furthermore, White et al. specifically fails to teach or suggest matching a logical form to transfer mappings in a transfer mapping database by matching at least a portion of the input logical form with the transfer mapping, based on a predetermined metric..." as set out in independent claim 16.

Independent claim 18 includes "A transfer mapping database including a plurality of transfer mapping dependency structures formed based on at least 10,000, aligned, training sentences; a matching component configured to receive the input dependency structure and to match it against a matching set of one or more of the transfer mapping dependency structures in the transfer mapping database...". Not only does White et al. fail to disclose a system that can be scaled to the level of 10,000 parallel, aligned training sentences, in any meaningful way, but they specifically fail to even teach or suggest scalability. Instead, by mapping directly to syntax trees, White et al. incorporates many of the same disadvantages of prior systems discussed in the background of the present application, which suffer greatly due to their lack of scaleability. Thus,

Applicant submits that independent claim 18 is allowable as well.

Further, since White et al. specifically fails to teach or suggest any notion that an input logical form is matched against a target logical form, there is no teaching or suggestion in White et al., whatsoever, that a transfer mapping database that contains logical forms is trained. White et al. has no need for such a database, and therefore they specifically fail to teach or suggest how one is created. However, claim 23 specifically teaches a computer implemented method of training a transfer mapping database. Claim 23 claims "receiving an plurality of parallel, aligned, pairs of input sentences in two different languages; generating input logical forms for the input sentences in both languages, the input logical forms being shared across both languages; and training the transfer mapping database based on the input logical forms." There is no teaching or suggestion in White et al., whatsoever, of how to train a transfer mapping database. Nor is there any discussion, whatsoever, that logical forms are trained which are shared across multiple languages. Further, there is no teaching or suggestion, whatsoever, that the transfer mapping database is trained based on the input logical forms. Thus, Applicant submits that independent claim 23 is allowable.

Similarly, independent claim 32 claims a computer implemented method of training a transfer mapping database which includes receiving the parallel, aligned pairs of input sentences in different languages, "generating input logical forms for the input sentences in both languages; aligning the input logical forms to obtain transfer mappings; filtering the transfer mappings obtained; and training the transfer mapping database based on the filtered transfer mappings." Thus, independent claim 32 claims a method of training the transfer mappings in even more detail, in which the logical forms are created, then they are aligned, then they are filtered and finally the database

is trained based only on the filtered transfer mappings. Since White et al. neither teaches nor suggests any training of a transfer mapping database, it cannot teach or suggest the method setout in independent claim 32. Thus, Applicant submits that independent claim 32 is allowable.

Applicant submits that, because independent claims 1, 16, 18, 23 and 32 are allowable, dependent claims 2-15, 17, 19-22, 24-31 and 33-34 are allowable by virtue of their dependence on allowable independent claims. However, Applicant also submits that a number of the dependent claims are allowable, independently. For instance, since White et al. neither teaches nor suggests any way of selecting a transfer mapping, it cannot teach or suggest the particular ways of selecting transfer mappings based on the number of nodes covered by the set of transfer mappings or based on the sizes of the plurality of matching transfer mappings. White et al. does discuss parsing syntactic trees, but there is no discussion, whatsoever, of matching anything to a logical form, much less matching another logical form to a logical form. Thus, Applicant submits that dependent claims 2 and 3 are independently allowable.

In addition, there is no discussion, whatsoever, of generating a linked logical form indicative of links between an input logical form and logical forms in the transfer mapping database, as set out in dependent claim 10. Thus, Applicant submits that claim 10 is independently allowable.

Further, dependent claim 14 specifically states that the set of matching transfer mappings are overlapping. This is neither taught nor suggested anywhere in White et al. To the extent that White et al. describes anything regarding overlapping structures, they discuss syntactic parse trees and say that they cannot be overlapping. See column 8, lines 30-35. Thus, Applicant submits that dependent claim 14 is allowable as well.

The Examiner cited the Meyer reference in rejecting dependent claims 4-9. However, Meyer says nothing, whatsoever, about matching logical forms, and particularly matching transfer mappings based on the size of the matching transfer mappings (claim 4), based on how frequently they were generated during training (claim 5), based on how often the transfer mappings were generated from completely aligned logical forms and partially aligned logical forms during training (claims 6 and 7), based on how often the transfer mappings were generated in training with non-fitted parses (claim 8), and based on the confidence score (claim 9). Thus, Applicant submits that dependent claims 4-9 are independently allowable.

As discussed above with respect to independent claim 18, White et al. is completely silent as to the scalability or sizes of the training data used to train the system. Similarly, they do not teach or suggest any type of transfer mapping database. However, dependent claim 19-22 specifically claim that the training data includes at least 50,000, at least 100,000, at least 180,000, and at least 200,000 (respectively) parallel, aligned, training sentences. Due to the difficulty in scaling a system such as that set out in White et al., there is no teaching or suggestion of scaling the system to such a large extent. Thus, Applicant submits that dependent claims 19-22 are allowable.

Finally, because there is no discussion, whatsoever, of training a transfer mapping database in White et al., and because dependent claims 24-31 and 33-34 are steps drawn to training such a database, Applicant submits that those dependent claims are neither taught nor suggested by anything in White et al. Applicant thus submits that those dependent claims are independently allowable as well.

In conclusion, Applicant submits that claims 1-34 are allowable over the references cited by the Examiner. The

dependent claims are also allowable both by virtue of their dependence on allowable independent claims, and because they are independently allowable over the references. Reconsideration and allowance of claims 1-34 are respectfully requested.

The Director is authorized to charge any fee deficiency required by this paper or credit any overpayment to Deposit Account No. 23-1123.

Respectfully submitted,

WESTMAN, CHAMPLIN & KELLY, P.A.

By: _____

Joseph R. Kelly, Reg. No. 34,847
Suite 1400 - International Centre
900 Second Avenue South
Minneapolis, Minnesota 55402-3319
Phone: (612) 334-3222 Fax: (612) 334-3312

JRK:slg